

Overuse of Imaging

Measure 2: Overuse of Imaging for the Evaluation of Children with Primary Headache

Description

This measure assesses the percentage of children, ages 4 through 17 years old, for whom imaging of the head (CT or MRI) is obtained for the evaluation of primary headache without indications for neuroimaging, including neurologic deficit lasting longer than 60 minutes, signs and symptoms of increased intracranial pressure, or lumbar puncture. Primary headache must be diagnosed on the day of or 30 days prior to imaging. A lower percentage indicates better performance, as reflected by avoidance of imaging when it is not indicated.

Calculation

This measure of imaging overuse requires administrative and medical record data and is calculated as a percentage as follows:

The number of children with primary headache for whom imaging of the head (CT or MRI) is obtained without indication for neuroimaging divided by the number of eligible children with primary headache for whom imaging of the head (CT or MRI) is obtained (numerator divided by denominator times 100%).

Eligible Population

The determination of the eligible population for this measure requires administrative and medical record data.

Ages	Children at least 4 years old on January 1 of the measurement year but younger than 18 years old on December 31 of the measurement year.
Enrollment	Eligible children must be continuously enrolled in their same insurance-plan enrollment during both the measurement year and the year prior to the measurement year.
Event/Diagnosis	Imaging studies of the head (CT or MRI; Table IMG1) for the evaluation of primary headache (based on ICD-9-CM codes listed in Table IMG3), occurring on the day of or up to 30 days prior to imaging. (Note, IMG tables begin on page 50.)

Specification

Denominator	The the number of children, ages 4 through 17 years old, for whom imaging of the head (CT or MRI) is obtained for the evaluation of primary headache.
Numerator	The number of children, ages 4 through 17 years old, for whom imaging of the head (CT or MRI) is obtained for the evaluation of primary headache without indications for neuroimaging.

Exclusions

Denominator Exclusions

- Exclusions based on ICD-9-CM or CPT codes captured in administrative claims data:
 - Seizure or convulsions (Table IMG2) diagnosed during a visit on the day of or day before imaging was obtained
 - Head trauma (Table IMG9 or the presence of an E-code) on the day of or within 7 days before imaging was obtained
 - Neurosurgical intervention (Table IMG10) on the day of or within 180 before imaging was obtained
 - Secondary headache (Table IMG3) diagnosed during a visit on the day of or within the 365 days before imaging was obtained
 - Medical conditions that could warrant imaging in the setting of a headache on the day of or within the 365 days before imaging was obtained (Tables IMG4-IMG8)

- Exclusions based on clinical documentation:
 - Seizure or convulsions as the indication for imaging
 - Trauma
 - abuse
 - concussion
 - skull fracture
 - intracranial hemorrhage
 - Neurological surgery
 - Secondary headache
 - Medical conditions that could warrant imaging in the setting of a headache:
 - infection such as meningitis, brain abscess, HIV and encephalitis
 - neoplasm, tumor
 - tuberous sclerosis
 - blood disorder
 - hemangioma, phlebitis/thrombophlebitis, occlusion of cerebral arteries, moyamoya disease
 - hydrocephalus and CNS anomalies, dwarfism

Numerator Exclusions

- Exclusions based on clinical documentation:
 - Neurologic deficits lasting 60 minutes or longer on the day of or day prior to imaging
 - Abnormal neurologic exam between the time of diagnosis and the time of imaging
 - Signs or symptoms of increased intracranial pressure
 - Lumbar puncture on the day of or day after neuroimaging

Table 1 [=IMG1]: Codes to Identify Neuroimaging in Administrative Claims

Imaging Modality	Code Type	Codes
Computerized Tomography (CT) of Brain/Head	Revenue (UB-92)	350, 351, 352, 353, 354, 355, 356, 357, 358, 359
	CPT	70450, 70460, 70470, 70480, 70481,70482
	ICD-9-CM	87.03
Magnetic Resonance Imaging (MRI) of Brain/Head	Revenue (UB-92)	610, 611, 612, 613, 614, 615, 616, 617, 618, 619
	CPT	70551, 70552, 70553
	ICD-9-CM	88.91

Table 2 [=IMG3]: ICD-9-CM Codes to Identify Headache

General Diagnosis	Diagnosis Details	ICD-9-CM Code
Migraine		
	Migraine with aura	346.0
	Migraine without aura	346.1
	Variants of migraine, not elsewhere classified (abdominal migraine, cyclical vomiting, ophthalmoplegic migraine, periodic headache syndromes in child or adolescent)	346.2
	Hemiplegic migraine	346.3
	Menstrual migraine	346.4
	Persistent migraine aura w/o cerebral infarction	346.5
	Chronic migraine without aura	346.7
	Other forms of migraine	346.8
	Migraine, unspecified	346.9
Headache syndromes		
	Tension type headache	339.1x
	Tension headache NOS/related to psych factors	307.81
	Cluster headaches/other trigeminal autonomic cephalalgias	339.0x
	Drug induced headache	339.3
	Hypnic headache	339.81
	Primary stabbing headache	339.85
	"Other"	339.89
Other		
General Symptoms	Headache	784.0
Complicated headache syndromes		
	Persistent migraine aura WITH cerebral infarction	346.6
	Hemicranium continua	339.41
	New daily persistent	339.42
	Primary thunderclap	339.43
	Other complicated	339.44
Other		
Post-traumatic headache		339.2x
Acute pain due to trauma		338.11

Table 3 [=IMG2]: ICD-9-CM Codes to Identify Epilepsy and Recurrent Seizures

Diagnosis Category	Diagnosis Detail	ICD-9-CM Code
Epilepsy and recurrent seizures		
Generalized non-convulsive	Absences (atonic, typical), minor epilepsy, petit mal, pykno-epilepsy, seizures (akinetic, atonic)	345.0
Generalized convulsive	Epileptic seizures (clonic, tonic, myoclonic, tonic-clonic), grand mal, major epilepsy	345.1
Petit mal status	Epileptic absence status	345.2
Grand mal status	Status epilepticus NOS	345.3
Localized-related (focal) (partial) epilepsy and epileptic syndromes with complex partial seizures	Epilepsy (limbic system partial, psychomotor, psychosensory, temporal lobe), Epileptic automatism	345.4
Localized-related (focal) (partial) epilepsy and epileptic syndromes with simple partial seizures	Epilepsy (Bravais-Jacksonian NOS, focal (motor) NOS, Jacksonian NOS, motor partial, partial NOS, sensory-induced, somatomotor, somatosensory, visceral, visual	345.5
Infantile spasms	Hypsarrhythmia, Lightning spasms, Salaam attacks	345.6
Epilepsia partialis continua	Kojevnikov's epilepsy	345.7
Other forms of epilepsy and recurrent seizures	Cursive [running] gelastic	345.8
Epilepsy, unspecified	Epileptic convulsions, fits or seizures NOS, recurrent seizures NOS, seizure disorder NOS	345.9
General Symptoms		
	Post-traumatic seizure	780.33
	Other convulsions	780.39

Table 4 [=IMG9]: ICD-9-CM Codes to Identify Head Trauma and Intracranial Hemorrhage

General Diagnosis	Diagnosis Detail	ICD-9-CM Code
Post-traumatic headache		339.2x
Concussion	With no loss of consciousness	850.0
	With brief loss of consciousness	850.1
Fracture of skull	Closed w/o mention of intracranial injury	800.0
	Closed with cerebral laceration and contusion	800.1
	Closed with subarachnoid, subdural and extradural hemorrhage	800.2
	Closed with other and unspecified intracranial hemorrhage	800.3
	Closed with intracranial injury of other and unspecified nature	800.4
	Open w/o mention of intracranial injury	800.5
	Open with cerebral laceration and contusion	800.6
	Open with subarachnoid, subdural and extradural hemorrhage	800.7
	Open with other and unspecified intracranial hemorrhage	800.8
	Open with intracranial injury of other, unspecified nature	800.9
	Fracture of skull base	801.x
	Other, unqualified skull fracture	803.x
	Multiple fractures involving skull or face with other bones	804.x
Concussion	With loss of consciousness (LOC) 30min or less	850.11
	With LOC 31 minutes to 59 minutes	850.12
	With moderate LOC (1-24 hours)	850.2
	With prolonged LOC and return to pre-existing conscious level	850.3
	With prolonged LOC, without return to pre-existing conscious level	850.4
	With loss of consciousness of unspecified duration	850.5
	Concussion, unspecified	850.9
	Cerebral laceration and contusion	851.x
	Subarachnoid, subdural, extradural hemorrhage post injury	852.x
	Other/unspecified intracranial hemorrhage following injury	853.x
	Intracranial injury of other and unspecified nature	854.x
	Subarachnoid hemorrhage	430
	Intracerebral hemorrhage	431
	Other and unspecified intracranial hemorrhage	432.x
	Child abuse and neglect	995.5x
	Observation and evaluation for – abuse and neglect	V71.81
	Late effect of fracture of skull and face bones	905.0
	Late effect of intracranial injury without mention of skull fracture	907.0

Table 5 [=]: CPT Codes to Identify Lumbar Puncture and Recent Neurosurgical Procedures

Procedure	CPT Code
Spinal Tap	
Spinal puncture lumbar diagnostic	62270
Spinal tap	03.31
Anesthesia for dx or therapeutic lumbar puncture	635
Neurosurgery	
Transcatheter placement of extracranial cerebrovascular artery stent(s), percutaneous; initial vessel	0005T
Each additional vessel (list separately in addition to code for primary procedure)	0006T
Transcatheter placement of extracranial cerebrovascular artery stent(s), percutaneous, radiological supervision and interpretation, each vessel	0007T
Anesthesia for intracranial procedures; not otherwise specified	00210
Anesthesia for intracranial procedures; craniotomy or craniectomy for evacuation of hematoma	00211
Anesthesia for intracranial procedures; subdural taps	00212
Anesthesia for intracranial procedures; burr holes, including ventriculography	00214
Anesthesia for intracranial procedures; cranioplasty or elevation of depressed skull fracture, extradural (simple or compound)	00215
Anesthesia for intracranial procedures; vascular procedures	00216
Anesthesia for intracranial procedures; procedures in sitting position	00218
Anesthesia for intracranial procedures; cerebrospinal fluid shunting procedures	00220
Anesthesia for intracranial procedures; electrocoagulation of intracranial nerve	00222
Stereotactic placement of infusion catheter(s) in the brain for delivery of therapeutic agent(s), including computerized stereotactic planning and burr hole(s)	0169T
Anesthesia for therapeutic interventional radiological procedures involving the arterial system; intracranial, intracardiac, or aortic	01926
Anesthesia for therapeutic interventional radiological procedures involving the venous/lymphatic system (not to include access to the central circulation); intracranial	01933
Ventricular puncture through previous burr hole, fontanelle, suture, or implanted ventricular catheter/reservoir; without injection	61020
Ventricular puncture through previous burr hole, fontanelle, suture, or implanted ventricular catheter/reservoir; with injection of medication or other substance for diagnosis or treatment	61026
Cisternal or lateral cervical (c1-c2) puncture; without injection (separate procedure)	61050
Cisternal or lateral cervical (c1-c2) puncture; with injection of medication or other substance for diagnosis or treatment (eg, c1-c2)	61055
Puncture of shunt tubing or reservoir for aspiration or injection procedure	61070
Twist drill hole for subdural or ventricular puncture	61105
Twist drill hole for subdural or ventricular puncture; followed by other surgery	61106
Twist drill hole for subdural or ventricular puncture; for implanting ventricular catheter or pressure recording device	61107
Twist drill hole for subdural or ventricular puncture; for evacuation and/or drainage of subdural hematoma	61108
Burr hole(s) for ventricular puncture (including injection of gas, contrast media, dye, or radioactive material); followed by other surgery	61130
Burr hole(s) or trephine; with biopsy of brain or intracranial lesion	61140
Burr hole(s) or trephine; with drainage of brain abscess or cyst	61150
Burr hole(s) or trephine; with subsequent tapping (aspiration) of intracranial abscess or cyst	61151

Procedure	CPT Code
Burr hole(s) with evacuation and/or drainage of hematoma, extradural or subdural	61154
Burr hole(s); with aspiration of hematoma or cyst, intracerebral	61156
Burr hole(s); for implanting ventricular catheter, reservoir, eeg electrode(s), pressure recording device, or other cerebral monitoring device (separate procedure)	61210
Insertion of subcutaneous reservoir, pump or continuous infusion system for connection to ventricular catheter	61215
Burr hole(s) or trephine, supratentorial, exploratory, not followed by other surgery	61250
Burr hole(s) or trephine, infratentorial, unilateral or bilateral	61253
Craniectomy or craniotomy, exploratory; supratentorial	61304
Craniectomy or craniotomy, exploratory; infratentorial (posterior fossa)	61305
Craniectomy or craniotomy for evacuation of hematoma, supratentorial; extradural or subdural	61312
Craniectomy or craniotomy for evacuation of hematoma, supratentorial; intracerebral	61313
Craniectomy or craniotomy for evacuation of hematoma, infratentorial; extradural or subdural	61314
Craniectomy or craniotomy for evacuation of hematoma, infratentorial; intracerebellar	61315
Incision and subcutaneous placement of cranial bone graft (list separately in addition to code for primary procedure)	61316
Craniectomy or craniotomy, drainage of intracranial abscess; supratentorial	61320
Craniectomy or craniotomy, drainage of intracranial abscess; infratentorial	61321
Craniectomy or craniotomy, decompressive, with or without duraplasty, for treatment of intracranial hypertension, without evacuation of associated intraparenchymal hematoma; without lobectomy	61322
Craniectomy or craniotomy, decompressive, with or without duraplasty, for treatment of intracranial hypertension, without evacuation of associated intraparenchymal hematoma; with lobectomy	61323
Decompression of orbit only, transcranial approach	61330
Exploration of orbit (transcranial approach); with biopsy	61332
Exploration of orbit (transcranial approach); with removal of lesion	61333
Exploration of orbit (transcranial approach); with removal of foreign body	61334
Subtemporal cranial decompression (pseudotumor cerebri, slit ventricle syndrome)	61340
Craniectomy, suboccipital with cervical laminectomy for decompression of medulla and spinal cord, with or without dural graft (eg, arnold-chiari malformation)	61343
Other cranial decompression, posterior fossa	61345
Craniotomy for section of tentorium cerebelli (separate procedure)	61440
Craniectomy, subtemporal, for section, compression, or decompression of sensory root of gasserian ganglion	61450
Craniectomy, suboccipital; for exploration or decompression of cranial nerves	61458
Craniectomy, suboccipital; for section of one or more cranial nerves	61460
Craniectomy, suboccipital; for medullary tractotomy	61470
Craniectomy, suboccipital; for mesencephalic tractotomy or pedunculotomy	61480
Craniotomy for lobotomy, including cingulotomy	61490
Craniectomy; with excision of tumor or other bone lesion of skull	61500
Craniectomy; for osteomyelitis	61501
Craniectomy, trephination, bone flap craniotomy; for excision of brain tumor, supratentorial, except meningioma	61510
Craniectomy, trephination, bone flap craniotomy; for excision of meningioma, supratentorial	61512

Procedure	CPT Code
Craniectomy, trephination, bone flap craniotomy; for excision of brain abscess, supratentorial	61514
Craniectomy, trephination, bone flap craniotomy; for excision or fenestration of cyst, supratentorial	61516
Implantation of brain intracavitary chemotherapy agent (list separately in addition to code for primary procedure)	61517
Craniectomy for excision of brain tumor, infratentorial or posterior fossa; except meningioma, cerebellopontine angle tumor, or midline tumor at base of skull	61518
Craniectomy for excision of brain tumor, infratentorial or posterior fossa; meningioma	61519
Craniectomy for excision of brain tumor, infratentorial or posterior fossa; cerebellopontine angle tumor	61520
Craniectomy for excision of brain tumor, infratentorial or posterior fossa; midline tumor at base of skull	61521
Craniectomy, infratentorial or posterior fossa; for excision of brain abscess	61522
Craniectomy, infratentorial or posterior fossa; for excision or fenestration of cyst	61524
Craniectomy, bone flap craniotomy, transtemporal (mastoid) for excision of cerebellopontine angle tumor;	61526
Craniectomy, bone flap craniotomy, transtemporal (mastoid) for excision of cerebellopontine angle tumor; combined with middle/posterior fossa craniotomy/craniectomy	61530
Subdural implantation of strip electrodes through one or more burr or trephine hole(s) for long term seizure monitoring	61531
Craniotomy with elevation of bone flap; for subdural implantation of an electrode array, for long term seizure monitoring	61533
Craniotomy with elevation of bone flap; for excision of epileptogenic focus without electrocorticography during surgery	61534
Craniotomy with elevation of bone flap; for removal of epidural or subdural electrode array, without excision of cerebral tissue (separate procedure)	61535
Craniotomy with elevation of bone flap; for excision of cerebral epileptogenic focus, with electrocorticography during surgery (includes removal of electrode array)	61536
Craniotomy with elevation of bone flap; for lobectomy, temporal lobe, without electrocorticography during surgery	61537
Craniotomy with elevation of bone flap; for lobectomy with electrocorticography during surgery, temporal lobe	61538
Craniotomy with elevation of bone flap; for lobectomy with electrocorticography during surgery, other than temporal lobe, partial or total	61539
Craniotomy with elevation of bone flap; for lobectomy, other than temporal lobe, partial or total, without electrocorticography during surgery	61540
Craniotomy with elevation of bone flap; for transection of corpus callosum	61541
Craniotomy with elevation of bone flap; for total hemispherectomy	61542
Craniotomy with elevation of bone flap; for partial or subtotal (functional) hemispherectomy	61543
Craniotomy with elevation of bone flap; for excision or coagulation of choroid plexus	61544
Craniotomy with elevation of bone flap; for excision of craniopharyngioma	61545
Craniotomy for hypophysectomy or excision of pituitary tumor, intracranial approach	61546
Hypophysectomy or excision of pituitary tumor, transnasal or transseptal approach, nonstereotactic	61548
Craniectomy for craniosynostosis; single cranial suture	61550
Craniectomy for craniosynostosis; multiple cranial sutures	61552
Craniotomy for craniosynostosis; frontal or parietal bone flap	61556

Procedure	CPT Code
Craniotomy for craniostylosis; bifrontal bone flap	61557
Extensive craniectomy for multiple cranial suture craniostylosis (eg, cloverleaf skull); not requiring bone grafts	61558
Extensive craniectomy for multiple cranial suture craniostylosis (eg, cloverleaf skull); recontouring with multiple osteotomies and bone autografts (eg, barrel-stave procedure) (includes obtaining grafts)	61559
Excision, intra and extracranial, benign tumor of cranial bone (eg, fibrous dysplasia); without optic nerve decompression	61563
Excision, intra and extracranial, benign tumor of cranial bone (eg, fibrous dysplasia); with optic nerve decompression	61564
Craniotomy with elevation of bone flap; for selective amygdalohippocampectomy	61566
Craniotomy with elevation of bone flap; for multiple subpial transections, with electrocorticography during surgery	61567
Craniectomy or craniotomy; with excision of foreign body from brain	61570
Craniectomy or craniotomy; with treatment of penetrating wound of brain	61571
Transoral approach to skull base, brain stem or upper spinal cord for biopsy, decompression or excision of lesion;	61575
Transoral approach to skull base, brain stem or upper spinal cord for biopsy, decompression or excision of lesion; requiring splitting of tongue and/or mandible (including tracheostomy)	61576
Craniofacial approach to anterior cranial fossa; extradural, including lateral rhinotomy, ethmoidectomy, sphenoidectomy, without maxillectomy or orbital exenteration	61580
Craniofacial approach to anterior cranial fossa; extradural, including lateral rhinotomy, orbital exenteration, ethmoidectomy, sphenoidectomy and/or maxillectomy	61581
Craniofacial approach to anterior cranial fossa; extradural, including unilateral or bifrontal craniotomy, elevation of frontal lobe(s), osteotomy of base of anterior cranial fossa	61582
Craniofacial approach to anterior cranial fossa; intradural, including unilateral or bifrontal craniotomy, elevation or resection of frontal lobe, osteotomy of base of anterior cranial fossa	61583
Orbitocranial approach to anterior cranial fossa, extradural, including supraorbital ridge osteotomy and elevation of frontal and/or temporal lobe(s); without orbital exenteration	61584
Orbitocranial approach to anterior cranial fossa, extradural, including supraorbital ridge osteotomy and elevation of frontal and/or temporal lobe(s); with orbital exenteration	61585
Bicoronal, transzygomatic and/or lefort i osteotomy approach to anterior cranial fossa with or without internal fixation, without bone graft	61586
Infratemporal pre-auricular approach to middle cranial fossa (parapharyngeal space, infratemporal and midline skull base, nasopharynx), with or without disarticulation of the mandible, including parotidectomy, craniotomy, decompression and/or mobilization of the facial nerve and/or petrous carotid artery	61590
Infratemporal post-auricular approach to middle cranial fossa (internal auditory meatus, petrous apex, tentorium, cavernous sinus, parasellar area, infratemporal fossa) including mastoidectomy, resection of sigmoid sinus, with or without decompression and/ or mobilization of contents of auditory canal or petrous carotid artery	61591
Orbitocranial zygomatic approach to middle cranial fossa (cavernous sinus and carotid artery, clivus, basilar artery or petrous apex) including osteotomy of zygoma, craniotomy, extra- or intradural elevation of temporal lobe	61592
Transtemporal approach to posterior cranial fossa, jugular foramen or midline skull base, including mastoidectomy, decompression of sigmoid sinus and/or facial nerve, with or without mobilization	61595
Transcochlear approach to posterior cranial fossa, jugular foramen or midline skull base, including labyrinthectomy, decompression, with or without mobilization of facial nerve and/or petrous carotid artery	61596

Procedure	CPT Code
Transcondylar (far lateral) approach to posterior cranial fossa, jugular foramen or midline skull base, including occipital condylectomy, mastoidectomy, resection of c1-c3 vertebral body(s), decompression of vertebral artery, with or without mobilization	61597
Transpetrosal approach to posterior cranial fossa, clivus or foramen magnum, including ligation of superior petrosal sinus and/or sigmoid sinus	61598
Resection or excision of neoplastic, vascular or infectious lesion of base of anterior cranial fossa; extradural	61600
Resection or excision of neoplastic, vascular or infectious lesion of base of anterior cranial fossa; intradural, including dural repair, with or without graft	61601
Resection or excision of neoplastic, vascular or infectious lesion of infratemporal fossa, parapharyngeal space, petrous apex; extradural	61605
Resection or excision of neoplastic, vascular or infectious lesion of infratemporal fossa, parapharyngeal space, petrous apex; intradural, including dural repair, with or without graft	61606
Resection or excision of neoplastic, vascular or infectious lesion of parasellar area, cavernous sinus, clivus or midline skull base; extradural	61607
Resection or excision of neoplastic, vascular or infectious lesion of parasellar area, cavernous sinus, clivus or midline skull base; intradural, including dural repair, with or without graft	61608
Transection or ligation, carotid artery in cavernous sinus; without repair (list separately in addition to code for primary procedure)	61609
Transection or ligation, carotid artery in cavernous sinus; with repair by anastomosis or graft (list separately in addition to code for primary procedure)	61610
Transection or ligation, carotid artery in petrous canal; without repair (list separately in addition to code for primary procedure)	61611
Transection or ligation, carotid artery in petrous canal; with repair by anastomosis or graft (list separately in addition to code for primary procedure)	61612
Obliteration of carotid aneurysm, arteriovenous malformation, or carotid-cavernous fistula by dissection within cavernous sinus	61613
Resection or excision of neoplastic, vascular or infectious lesion of base of posterior cranial fossa, jugular foramen, foramen magnum, or c1-c3 vertebral bodies; extradural	61615
Resection or excision of neoplastic, vascular or infectious lesion of base of posterior cranial fossa, jugular foramen, foramen magnum, or c1-c3 vertebral bodies; intradural, including dural repair, with or without graft	61616
Secondary repair of dura for cerebrospinal fluid leak, anterior, middle or posterior cranial fossa following surgery of the skull base; by free tissue graft (eg, pericranium, fascia, tensor fascia lata, adipose tissue, homologous or synthetic grafts)	61618
Secondary repair of dura for cerebrospinal fluid leak, anterior, middle or posterior cranial fossa following surgery of the skull base; by local or regionalized vascularized pedicle flap or myocutaneous flap (including galea, temporalis, frontalis or occipitalis muscle)	61619
Endovascular temporary balloon arterial occlusion, head or neck (extracranial/intracranial) including selective catheterization of vessel to be occluded, positioning and inflation of occlusion balloon, concomitant neurological monitoring, and radiologic supervision and interpretation of all angiography required for balloon occlusion and to exclude vascular injury post occlusion	61623
Transcatheter permanent occlusion or embolization (eg, for tumor destruction, to achieve hemostasis, to occlude a vascular malformation), percutaneous, any method; central nervous system (intracranial, spinal cord)	61624
Transcatheter permanent occlusion or embolization (eg, for tumor destruction, to achieve hemostasis, to occlude a vascular malformation), percutaneous, any method; non-central nervous system, head or neck (extracranial, brachiocephalic branch)	61626
Balloon angioplasty, intracranial (eg, atherosclerotic stenosis), percutaneous	61630

Procedure	CPT Code
Transcatheter placement of intravascular stent(s), intracranial (eg, atherosclerotic stenosis), including balloon angioplasty, if performed	61635
Balloon dilatation of intracranial vasospasm, percutaneous; initial vessel	61640
Balloon dilatation of intracranial vasospasm, percutaneous; each additional vessel in same vascular family (list separately in addition to code for primary procedure)	61641
Balloon dilatation of intracranial vasospasm, percutaneous; each additional vessel in different vascular family (list separately in addition to code for primary procedure)	61642
Surgery of intracranial arteriovenous malformation; supratentorial, simple	61680
Surgery of intracranial arteriovenous malformation; supratentorial, complex	61682
Surgery of intracranial arteriovenous malformation; infratentorial, simple	61684
Surgery of intracranial arteriovenous malformation; infratentorial, complex	61686
Surgery of intracranial arteriovenous malformation; dural, simple	61690
Surgery of intracranial arteriovenous malformation; dural, complex	61692
Surgery of complex intracranial aneurysm, intracranial approach; carotid circulation	61697
Surgery of complex intracranial aneurysm, intracranial approach; vertebrobasilar circulation	61698
Surgery of simple intracranial aneurysm, intracranial approach; carotid circulation	61700
Surgery of simple intracranial aneurysm, intracranial approach; vertebrobasilar circulation	61702
Surgery of intracranial aneurysm, cervical approach by application of occluding clamp to cervical carotid artery (Selverstone-Crutchfield type)	61703
Surgery of aneurysm, vascular malformation or carotid-cavernous fistula; by intracranial and cervical occlusion of carotid artery	61705
Surgery of aneurysm, vascular malformation or carotid-cavernous fistula; by intracranial electrothrombosis	61708
Surgery of aneurysm, vascular malformation or carotid-cavernous fistula; by intra-arterial embolization, injection procedure, or balloon catheter	61710
Anastomosis, arterial, extracranial-intracranial (eg, middle cerebral/cortical) arteries	61711
Microdissection, intracranial or spinal procedure (list separately in addition to code for primary procedure)	61712
Creation of lesion by stereotactic method, including burr hole(s) and localizing and recording techniques, single or multiple stages; globus pallidus or thalamus	61720
Creation of lesion by stereotactic method, including burr hole(s) and localizing and recording techniques, single or multiple stages; subcortical structure(s) other than globus pallidus or thalamus	61735
Stereotactic biopsy, aspiration, or excision, including burr hole(s), for intracranial lesion;	61750
Stereotactic biopsy, aspiration, or excision, including burr hole(s), for intracranial lesion; with computed tomography and/or magnetic resonance guidance	61751
Stereotactic implantation of depth electrodes into the cerebrum for long term seizure monitoring	61760
Stereotactic localization, including burr hole(s), with insertion of catheter(s) or probe(s) for placement of radiation source	61770
Stereotactic computer-assisted (navigational) procedure; cranial, intradural (list separately in addition to code for primary procedure)	61781
Stereotactic computer-assisted (navigational) procedure; cranial, extradural (list separately in addition to code for primary procedure)	61782
Stereotactic computer-assisted (navigational) procedure; spinal (list separately in addition to code for primary procedure)	61783
Stereotactic radiosurgery (particle beam, gamma ray or linear accelerator), one or more sessions	61793

Procedure	CPT Code
Stereotactic computer assisted volumetric (navigational) procedure, intracranial, extracranial, or spinal (list separately in addition to code for primary procedure)	61795
Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); 1 simple cranial lesion	61796
Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional cranial lesion, simple (list separately in addition to code for primary procedure)	61797
Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); 1 complex cranial lesion	61798
Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional cranial lesion, complex (list separately in addition to code for primary procedure)	61799
Application of stereotactic headframe for stereotactic radiosurgery (list separately in addition to code for primary procedure)	61800
Twist drill or burr hole(s) for implantation of neurostimulator electrodes, cortical	61850
Twist drill or burr hole(s) for implantation of neurostimulator electrodes; subcortical	61855
Craniectomy or craniotomy for implantation of neurostimulator electrodes, cerebral, cortical	61860
Twist drill, burr hole, craniotomy, or craniectomy for stereotactic implantation of one neurostimulator array in subcortical site (eg, thalamus, globus pallidus, subthalamic nucleus, periventricular, periaqueductal gray)	61862
Twist drill, burr hole, craniotomy, or craniectomy with stereotactic implantation of neurostimulator electrode array in subcortical site (eg, thalamus, globus pallidus, subthalamic nucleus, periventricular, periaqueductal gray), without use of intraoperative microelectrode recording; first array	61863
Twist drill, burr hole, craniotomy, or craniectomy with stereotactic implantation of neurostimulator electrode array in subcortical site (eg, thalamus, globus pallidus, subthalamic nucleus, periventricular, periaqueductal gray), without use of intraoperative microelectrode recording; each additional array (list separately in addition to primary procedure)	61864
Craniectomy or craniotomy for implantation of neurostimulator electrodes, cerebral; subcortical	61865
Twist drill, burr hole, craniotomy, or craniectomy with stereotactic implantation of neurostimulator electrode array in subcortical site (eg, thalamus, globus pallidus, subthalamic nucleus, periventricular, periaqueductal gray), with use of intraoperative microelectrode recording; first array	61867
Twist drill, burr hole, craniotomy, or craniectomy with stereotactic implantation of neurostimulator electrode array in subcortical site (eg, thalamus, globus pallidus, subthalamic nucleus, periventricular, periaqueductal gray), with use of intraoperative microelectrode recording; each additional array (list separately in addition to primary procedure)	61868
Craniectomy for implantation of neurostimulator electrodes, cerebellar; cortical	61870
Craniectomy for implantation of neurostimulator electrodes, cerebellar; subcortical	61875
Revision or removal of intracranial neurostimulator electrodes	61880
Incision and subcutaneous placement of cranial neurostimulator pulse generator or receiver, direct or inductive coupling; with connection to a single electrode array	61885
Incision and subcutaneous placement of cranial neurostimulator pulse generator or receiver, direct or inductive coupling; with connection to two or more electrode arrays	61886
Revision or removal of cranial neurostimulator pulse generator or receiver	61888
Elevation of depressed skull fracture; simple, extradural	62000
Elevation of depressed skull fracture; compound or comminuted, extradural	62005
Elevation of depressed skull fracture; with repair of dura and/or debridement of brain	62010
Craniotomy for repair of dural/cerebrospinal fluid leak, including surgery for rhinorrhea/otorrhea	62100
Reduction of craniomegalic skull (eg, treated hydrocephalus); not requiring bone grafts or	62115

Procedure	CPT Code
cranioplasty	
Reduction of craniomegalic skull (eg, treated hydrocephalus); with simple cranioplasty	62116
Reduction of craniomegalic skull (eg, treated hydrocephalus); requiring craniotomy and reconstruction with or without bone graft (includes obtaining grafts)	62117
Repair of encephalocele, skull vault, including cranioplasty	62120
Craniotomy for repair of encephalocele, skull base	62121
Cranioplasty for skull defect; up to 5 cm diameter	62140
Cranioplasty for skull defect; larger than 5 cm diameter	62141
Removal of bone flap or prosthetic plate of skull	62142
Replacement of bone flap or prosthetic plate of skull	62143
Cranioplasty for skull defect with reparative brain surgery	62145
Cranioplasty with autograft (includes obtaining bone grafts); up to 5 cm diameter	62146
Cranioplasty with autograft (includes obtaining bone grafts); larger than 5 cm diameter	62147
Incision and retrieval of subcutaneous cranial bone graft for cranioplasty (list separately in addition to code for primary procedure)	62148
Neuroendoscopy, intracranial, for placement or replacement of ventricular catheter and attachment to shunt system or external drainage (list separately in addition to code for primary procedure)	62160
Neuroendoscopy, intracranial; with dissection of adhesions, fenestration of septum pellucidum or intraventricular cysts (including placement, replacement, or removal of ventricular catheter)	62161
Neuroendoscopy, intracranial; with fenestration or excision of colloid cyst, including placement of external ventricular catheter for drainage	62162
Neuroendoscopy, intracranial; with retrieval of foreign body	62163
Neuroendoscopy, intracranial; with excision of brain tumor, including placement of external ventricular catheter for drainage	62164
Neuroendoscopy, intracranial; with excision of pituitary tumor, transnasal or trans-sphenoidal approach	62165
Ventriculocisternostomy (Torkildsen type operation)	62180
Creation of shunt; subarachnoid/subdural-atrial, -jugular, -auricular	62190
Creation of shunt; subarachnoid/subdural-peritoneal, -pleural, other terminus	62192
Replacement or irrigation, subarachnoid/subdural catheter	62194
Ventriculocisternostomy, third ventricle;	62200
Ventriculocisternostomy, third ventricle; stereotactic, neuroendoscopic method	62201
Creation of shunt; ventriculo-atrial, -jugular, -auricular	62220
Creation of shunt; ventriculo-peritoneal, -pleural, other terminus	62223
Replacement or irrigation, ventricular catheter	62225
Replacement or revision of cerebrospinal fluid shunt, obstructed valve, or distal catheter in shunt system	62230
Removal of complete cerebrospinal fluid shunt system; without replacement	62256
Removal of complete cerebrospinal fluid shunt system; with replacement by similar or other shunt at same operation	62258

Table 6 [=IMG4]: ICD-9-CM Codes to Identify Infection

General Diagnosis	Diagnosis Detail	ICD-9-CM Code
Amebic brain abscess		006.5
Tuberculosis of meninges and central nervous system		013.0
Meningococcal meningitis		036.0
HIV		042
Meningitis due to enterovirus		047
Other enterovirus diseases of the central nervous system		048
Other non-arthropod-borne viral diseases of central nervous system		049
Postvaricella encephalitis		052.0
Herpes zoster with meningitis		053.0
Herpetic meningoencephalitis		054.3
Herpes simplex meningitis		054.72
Postmeasles encephalitis		055.0
Rubella with neurological complications		056.0x
Other human herpesvirus encephalitis		058.2
Mosquito-borne viral encephalitis		062.x
Tick-borne viral encephalitis		063.x
Viral encephalitis transmitted by other and unspecified arthropods		064
West Nile fever with encephalitis		066.41
Mumps meningitis/encephalitis		072.1, 072.2
Meningitis	Bacterial	320.xx
	Other organisms	321.x
	Unspecified cause	322.x
Encephalitis, myelitis, encephalomyelitis		323.xx
Intracranial and intraspinal abscess		324.x

Table 7 [=IMG5]: ICD-9-CM Codes to Identify Neoplasm/Blood Disorder

General Diagnosis	Diagnosis Detail	ICD-9-CM Code
Malignant neoplasm of brain		191.x
Malignant neoplasm of pituitary gland		194.3
Malignant neoplasm of pineal gland		194.4
Secondary malignant neoplasm of other sites – brain		198.3
Benign neoplasm of brain		225.0
Benign neoplasm of cranial nerves		225.1
Benign neoplasm of cerebral meninges		225.2
Neoplasm of uncertain behavior – pituitary		237.0
Neoplasm of uncertain behavior – pineal gland		237.1
Neurofibromatosis		237.7x
Personal history of malignant neoplasm of – brain		V10.85
Sickle cell disease		282.6
Pancytopenia		284.1
Coagulation defects		286.x
Purpura and other hemorrhage conditions	Qualitative platelet defects	287.1
	Primary thrombocytopenia	287.3x
	2ndary thrombocytopenia	287.4
	Thrombocytopenia, unspecified	287.5
	Other specified hemorrhagic conditions	287.8
	Unspecified hemorrhage conditions	287.9
Other specific diseases of blood and blood forming organs	Primary hypercoagulable state	289.81
	2ndary hypercoagulable state	289.82
Anticoagulants (<i>Adverse Effects in Therapeutic Use</i>)		E934.2

Table 8 [=IMG6]: ICD-9-CM Codes to Identify Hydrocephalus and Central Nervous System (CNS) Anomalies

General Diagnosis	Diagnosis Detail	ICD-9-CM Code
Precocious puberty		259.1
Hydrocephalus		
Obstructive hydrocephalus		331.4
Congenital hydrocephalus		742.3
Spina bifida with hydrocephalus		741.0
Mechanical complication of CNS device, implant, graft		996.2
Infection and inflammatory reaction due to CNS device, implant, and graft		996.63
Other complications of internal prosthetic device, implant, and graft due to CNS device, implant, and graft		996.75
Presence of cerebrospinal fluid drainage device		V45.1
Mucopolysaccharidosis (hydrocephalus and seizure)		277.5
CNS and skull anomalies		
Other congenital anomalies of nervous system	Encephalocele	742.0
Reduction deformities of brain	Absence part of brain, agenesis part of brain, agyria, lissencephaly, microgyria, etc	742.2
Other specified anomalies of brain	Congenital cerebral cyst, macrocephaly, etc	742.4
Conditions increasing risk for Hydrocephalus	Dwarfism, NOS	259.4
	Achondroplastic dwarfism	756.4
	Spina bifida	740.x
Other congenital musculoskeletal anomalies	Anomalies of skull face bones Includes craniosynostosis	756.0
Other and unspecified congenital anomalies	Tuberous sclerosis	759.5
Other conditions of the brain	Cerebral cysts	348.0
	Idiopathic intracranial hypertension	348.2
CNS complications from surgically implanted device		349.1

Table 9 [=IMG7]: ICD-9-CM Codes to Identify Congenital Heart Disease

General Diagnosis	Diagnosis Detail	ICD-9-CM Code
Bulbus cordis/cardiac septal closure anomalies	Common truncus	745.0
	Transposition	745.1x
	Tetrology of Fallot	745.2
	Common Ventricle	745.3
	Ventricular Septal Defect	745.4
	Atrial septal defect	745.5
	Endocardial cushion defects	745.6
	Cor biloculare	745.7
	Other	745.8
	Unspecified	745.9
Other congenital anomalies of the heart	Anomalies of pulmonary valve	746.0
	Tricuspid atresia and stenosis	746.1
	Ebstein's anomaly	746.2
	Stenosis of aortic valve	746.3
	Insufficiency of aortic valve	746.4
	Congenital mitral stenosis	746.5
	Congenital mitral insufficiency	746.6
	Hypoplastic left heart	746.7
Other specified anomalies of the heart	Subaortic stenosis	746.81
	Cor triatriatum	746.82
	Infundibular pulmonic stenosis	746.83
	Obstructive anomalies of heart	746.84
Other personal history presenting hazards to health	Surgery to heart and great vessels	V15.1

Table 10 [=IMG8]: ICD-9-CM Codes to Identify Vascular Disease

General Diagnosis	Diagnosis Detail	ICD-9-CM Code
Hemangioma of unspecified site (includes cavernous malformation)		228.00
Phlebitis/thrombophlebitis of intracranial venous sinuses		325
Occlusion and stenosis of precerebral arteries	Basilar artery	433.0
	Carotid artery	433.1
	Vertebral artery	433.2
	Multiple and bilateral	433.3
	Other specified	433.8
	Unspecified	433.9
Occlusion of the cerebral arteries	Cerebral thrombosis	434.0
	Cerebral embolism	434.1
	Cerebral artery occlusion	434.9
Transient cerebral ischemia	Basilar artery syndrome, vertebral artery syndrome, etc	435.x
Cerebral aneurysm, nonruptured		437.3
Moyamoya disease		437.5
Nonpyogenic thrombosis of intracranial venous sinus		437.6
Other congenital anomalies of the circulatory system	Coarctation of the aorta	747.1
	Other anomalies of the aorta	747.2x
Other specified anomalies of circulatory system (includes arteriovenous malformation)	Cerebrovascular anomalies	747.81
	Other (aneurysm)	747.89
Other venous embolism/thrombosis unspecified site		753.9
Other and unspecified intracranial hemorrhage		432.x
Personal history of other certain diseases	TIA and cerebral infarction	V12.5

Table 12 [=IMG11]: ICD-9-CM Codes to Identify Signs and Symptoms of Increased Intracranial Pressure or Herniation

Diagnosis Category	Diagnosis Detail	ICD-9-CM Code
Visual disturbances	Diplopia	368.2
Other disorders of eyelids	Ptosis	374.3
Disorders of the optic nerve and visual pathways	Papilledema	377.0x
Paralytic strabismus	Unspecified	378.50
	Third/oculomotor nerve palsy	378.5x
	Fourth/trochlear nerve palsy	378.53
	Sixth/abducens nerve palsy	378.54
Irregular eye movements	Nystagmus, unspecified	379.50
Pupillary function	Anisocoria	379.41
Vertigo of central origin		386.2
General symptoms		
	Alteration of consciousness	780.0
	Coma	780.01
	Transient alteration of awareness	780.02
	Persistent vegetative state	780.03
	Other (drowsiness, semicomma, somnolence, stupor, unconsciousness)	780.09
	Dizziness and giddiness	780.4
	Altered mental status	780.97
	Abnormality of gait	781.2
	Lack of coordination	781.3
	Transient paralysis of limb	781.4
	Ocular torticollis	781.93
	Facial weakness	781.94
Persistent vomiting		536.2
Other		
	Compression of the brain	348.4
	Cerebral edema	348.5